SEVERE BURNS

The Prehospital Care Library
La Bibliothèque de Soins Préhospitaliers

Severe burns cause rapid, systemic physiological derangement beyond the skin injury itself. Early mortality is driven by airway compromise, shock, and inappropriate fluid management, while late mortality is driven by sepsis and multiorgan failure.

ED priorities:

- Secure the airway early before it is lost
- Restore perfusion without fluid overload
- Identify life threatening associated injuries
- Initiate early burn specific resuscitation
- Arrange early transfer to a burns centre

WHAT COUNTS AS SEVERE BURNS

Any of the following:

- **≥10% TBSA** (adult) partial/full thickness
- **≥5% TBSA** in children or elderly
- Burns to **face, airway, hands, feet, perineum, major joints**
- **Inhalation injury**
- **Electrical burns**
- **Chemical burns**
- Burns with associated trauma or comorbidity

Severity is determined by **physiology and location,** not appearance alone.

PRIMARY THREATS

1. **Airway loss**
2. **Hypovolaemic / distributive shock**
3. **Carbon monoxide or cyanide toxicity**
4. **Compartment syndromes**
5. **Inadequate early resuscitation**

AIRWAY & INHALATION INJURY

RED FLAGS FOR EARLY INTUBATION

- Burns to face or neck
- Hoarseness, stridor
- Soot in mouth or sputum
- Singed nasal hair
- Enclosed space fire
- Progressive swelling

Early, controlled intubation is safer than crash airway later.

PATHOPHYSIOLOGY

- Massive capillary leak → intravascular collapse
- Third spacing peaks in first 24 hours
- Burns ≥20% TBSA produce **systemic inflammatory response**
- Over resuscitation causes:
  - Pulmonary oedema
  - Abdominal compartment syndrome
  - Extremity compartment syndrome

INITIAL ASSESSMENT & TBSA ESTIMATION

- Use **Rule of Nines** or palmar method
- Estimate depth roughly (do not obsess)
- TBSA is for **resuscitation,** not surgical planning in the ED

FLUID RESUSCITATION

INITIAL STRATEGY

- Start crystalloids
- Use a formula (e.g. Parkland) **as a guide, not a goal**
- Give half in first 8 hours from time of burn

RESUSCITATION TARGET

- **Urine output ≥0.5 mL/kg/hr (adult)**
- **≥1 mL/kg/hr in children**
- MAP ≥65 mmHg

Urine output beats BP as a resuscitation guide.

CIRCULATION & ACCESS

- 2 large bore IVs through unburnt skin if possible
- IO acceptable if IV difficult
- Early arterial line if available in major burns

PAIN CONTROL (ESSENTIAL, OFTEN UNDERTREATED)

- IV opioids (titrated)
- Benzodiazepines for anxiety
- Avoid IM / oral routes initially
- Pain control reduces catecholamine driven shock

ASSOCIATED INJURIES (DO NOT MISS)

- Trauma (falls, explosions)
- Carbon monoxide poisoning
- Cyanide toxicity (enclosed fire, synthetic materials)
- Electrical burns → arrhythmias, rhabdomyolysis

WOUND CARE (ED PHASE)

- Stop the burning process
- Remove constricting items
- Cover burns with clean, dry dressings
- **Do not apply topical agents in the ED**

ESCHAROTOMY (LIMB SAVING)

Suspect if:

- Circumferential burns
- Increasing pain or tightness
- Reduced pulses
- Rising ventilatory pressures (chest wall)

This is a time sensitive surgical decision.

WHAT TO AVOID

- Delaying airway control
- Under recognising inhalation injury
- Excessive fluids
- Delayed transfer to burns centre
- Focusing on wound appearance over physiology

DISPOSITION

- Severe burns require specialist burns centre
- Early discussion improves outcomes
- Stabilise → package → transfer

CHECKLIST
SEVERE BURNS

PRIMARY SURVEY (ABCDE)

Airway

- [ ] Assess for inhalation injury
- [ ] Early intubation if any airway risk
- [ ] Cervical spine control if trauma suspected

Breathing

- [ ] Oxygen (100% initially)
- [ ] Monitor RR and SpO_2
- [ ] Consider CO poisoning

Circulation

- [ ] 2 large bore IV lines (or IO)
- [ ] Control active bleeding
- [ ] Continuous BP and ECG

Disability

- [ ] GCS
- [ ] Consider CO / smoke neurotoxicity

Exposure

- [ ] Undress fully
- [ ] Estimate TBSA
- [ ] Prevent hypothermia

IF A NEW BURN WITHIN 10 MINS, COOL WITH COOL RUNNING WATER FOR 20 MINS – MINIMUM, ALSO REMEMBER BURNS HURT! ADEQUATE ANALGESIA IS REQUIRED

TBSA & SEVERITY

- [ ] % TBSA estimated
- [ ] High risk locations identified
- [ ] Inhalation injury considered

FLUID RESUSCITATION

- [ ] Crystalloids started
- [ ] Formula used as guide
- [ ] Urinary catheter inserted
- [ ] Urine output ≥0.5 mL/kg/hr

PAIN & SEDATION

- [ ] IV opioids titrated
- [ ] Benzodiazepines if anxious
- [ ] Reassess pain frequently

ASSOCIATED INJURIES

- [ ] Trauma excluded
- [ ] CO poisoning considered
- [ ] Electrical injury considered

WOUND & LIMB CARE

- [ ] Remove restrictive items
- [ ] Clean, dry dressings applied
- [ ] Monitor for compartment syndrome
- [ ] Escharotomy considered if indicated

WHAT TO AVOID

- [ ] Delayed airway protection
- [ ] Fluid overload
- [ ] Topical agents in ED
- [ ] Delayed burns referral

DISPOSITION

- [ ] Burns centre contacted early
- [ ] Transfer arranged if required
- [ ] Clear handover:
  - TBSA
  - Time of burn
  - Fluids given
  - Airway status
  - Associated injuries